THE CLAIMS

1. A method of fabricating a magnetic memory element, the method comprising forming a ferromagnetic data layer with a controlled nucleation site.

2. The method of claim 1, wherein the nucleation site is not surrounded by a neighboring region of the data layer.

3. The method of claim 1, wherein the nucleation site has a lower switching threshold relative to a neighboring region of the data layer

4. The method of claim 1, wherein the nucleation site is formed at an edge of the data layer.

5. The method of claim 1, wherein the nucleation site is formed at a corner of the data layer.

6. The method of claim 1, wherein the nucleation site is one of a divet and a protrusion.

7. The method of claim 1, wherein at least one additional nucleation site is formed on the data layer.

8. The method of claim 7, wherein the nucleation sites have a symmetric arrangement on the data layer.

9. The method of claim 7, wherein the nucleation sites have a non-symmetric arrangement.

10. The method of claim 7, wherein the nucleation sites have a uniform size and shape.

11. The method of claim 1, further comprising forming additional magnetic tunnel junction layers.

12. A method of fabricating a data storage device, the method comprising forming an array of ferromagnetic data layers, each layer having first and second neighboring regions, the first region having a lower switching threshold than the second region, the first regions being substantially smaller than the second regions, the first regions at the same location on the data layers across the array.

13. The method of claim 12, wherein the first regions are located at corners of the data layers.

14. The method of claim 12, wherein the first regions are located at edges of the data layers.

15. The method of claim 12, wherein the first regions are either divets in the data layers or protrusion from the data layers.

16. The method of claim 12, wherein each data layer has more than one first region.

17. The method of claim 16, wherein each data layer has a symmetric arrangement of first regions.

18. The method of claim 16, wherein each data layer has a non-symmetric arrangement of first regions.

19. The method of claim 12, wherein the first regions have a uniform size and shape across the array.

20. The method of claim 12, wherein the first regions are formed during bit formation.

21. The method of claim 12, further comprising forming additional magnetic tunnel junction layers.

22. A data storage device comprising a plurality of magnetic memory elements, each element comprising first means for providing a reference magnetization, and second means for providing a data magnetization, the second means having first and second regions of different switching thresholds.

23. A data storage device comprising a plurality of magnetic memory elements, data layers of the elements having controlled nucleation sites.

24. The device of claim 23, wherein the nucleation sites are formed at edges of the data layers.

25. The device of claim 23, wherein the nucleation sites are formed at corners of the data layers.

26. The device of claim 23, wherein the nucleation sites are divets in the data layers or protrusions from the data layers.

27. The device of claim 23, wherein each data layer has at least one additional nucleation site.

28. The device of claim 27, wherein each data layer has a symmetric arrangement of the nucleation sites.

29. The device of claim 27, wherein each data layer has a non-symmetric arrangement of the nucleation sites.

30. The device of claim 23, wherein the nucleation sites have the same locations with respect to the data layers.

31. The device of claim 23, wherein each magnetic memory element further includes a reference ferromagnetic layer and an insulating tunnel barrier.

32. An MRAM device comprising an array of magnetic tunnel junctions, each junction including a data layer having controlled nucleation sites, the nucleation sites located at the edges of the data layers, the nucleation sites having uniform location, size and shape across the array.

33. A magnetic memory device comprising:

a data layer having at least two protrusions, the protrusions extending from edges of the data layer;

a reference layer; and

a spacer layer between the data and reference layers.

34. The device of claim 33, wherein the protrusions extend at corners of the data layer.

35. device of claim 33, wherein the protrusions have a symmetric arrangement on the data layer.

36. The device of claim 33, wherein the protrusions have non-symmetric arrangement to compensate for an offset in switching fields.

37. The device of claim 33, wherein the protrusions sites have a uniform size and shape.